

IN THE CLAIMS:

Please amend the claims as shown below, in which deleted terms are shown with strikethrough and/or double brackets, and added terms are shown with underscoring.

1. (Currently amended) A method of manufacturing a hollow cylindrical body [(W2)], comprising the steps of:

bringing end faces [(1, 2)] of a plate material [(W1)], having fingers ~~(7a through 7d)~~ projecting from corners along a joining direction, into abutment against each other to form protrusions [(8, 9)] projecting along the joining direction with end faces of the fingers ~~(7a through 7d)~~, and also to form a hollow cylindrical body [(W2)];

gripping said protrusions [(8, 9)] and friction-stir-welding abutting regions of the end faces [(1, 2)] to join the end faces [(1, 2)] to each other, thereby forming a hollow cylindrical body [(W2)] having protrusions [(8, 9)]; and

removing said protrusions [(8, 9)].

2. (Currently amended) A method of manufacturing a hollow cylindrical body [(W2)] according to claim 1, wherein said hollow cylindrical body [(W2)] having protrusions [(8, 9)] is pressed from [(the)] a side of an outer circumferential wall surface thereof when the abutting regions are friction-stir-welded.

3. (Currently amended) A method of manufacturing a hollow cylindrical body [(W2)] according to claim 1, wherein the abutting regions are friction-stir-welded while said hollow cylindrical body [(W2)] is inclined with respect to the horizontal direction.

4. (Currently amended) A method of manufacturing a hollow cylindrical body [(W2)]

according to claim 1, wherein a wheel rim that is joined to a wheel disk to produce a vehicular wheel is manufactured as said hollow cylindrical body [(W2)].

5. (Currently amended) A friction stir welding process for bringing a first end face [(1)] and a second end face [(2)] of a metal workpiece into abutment against each other, and thereafter joining said first end face [(1)] and said second end face [(2)] to each other with a rotating friction stir welding tool [(100)], wherein when a first end having said first end face [(1)] is present on a retreating side and a second end having said second end face [(2)] is present on an advancing side, a workpiece plunging member [(104)] having a substantially circular cross section, which is disposed on the tip end of said friction stir welding tool [(100)], is plunged with a central region thereof being displaced from a boundary line [(L2)] between said first end face [(1)] and said second end face [(2)] to said second end within a range equal to or smaller than the a radius of the workpiece plunging member [(104)].

6. (Currently amended) A friction stir welding process according to claim 5, wherein said workpiece plunging member [(104)] is displaced from said boundary line [(L2)] to said second end by a distance equal to or smaller than one-half of the radius of the workpiece plunging member [(104)].

7. (Original) A friction stir welding process according to claim 5, wherein a workpiece having said first end face and a workpiece having said second end face are separate from each other and are made of a chief component comprising the same metal.

8. (Currently amended) A friction stir welding process for bringing a first end face [(1)] and a second end face [(2)] of a metal workpiece having a curved surface[(d)] into abutment against each other to form abutting regions, and then friction-stir-welding the abutting regions to

join said end faces [(1, 2)] to each other, wherein

said first end face [(1)] and said second end face [(2)] have burrs [(5a, 5b)] projecting in [the] a thickness direction of said metal workpiece, and sags [(6a, 6b)] projecting in a direction transverse to said thickness direction;

when said abutting regions are formed, said sags [(6a, 6b)] of said first end face [(1)] and said second end face [(2)] are disposed in confronting relation to each other and positioned on an outer circumferential wall surface of said curved surface, and said burrs [(5a, 5b)] are positioned on an inner circumferential wall surface of said curved surface; and

when the abutting regions are friction-stir-welded, a plunging member [(104)] of a friction stir welding tool [(100)] is plunged into the outer circumferential wall surface on which said sags [(6a, 6b)] are disposed in confronting relation to each other, and thereafter said friction stir welding tool [(100)] is moved to scan said abutting regions.

9. (Currently amended) A friction stir welding process according to claim 8, wherein said first end face [(1)] and said second end face [(2)] are present on the same metal workpiece, and said abutting regions are provided by curving said metal workpiece to bring said first end face [(1)] and said second end face [(2)] into abutment against each other.

10 – 15. (Cancelled)

16. (Currently amended) A friction stir welding apparatus [(120)] for bringing end faces [(1, 2)] of a plate material [(W1)], having fingers ~~(7a through 7d)~~ at corners thereof, into abutment against each other to form a hollow cylindrical body [(W2)], and friction-stir-welding said end faces [(1, 2)] to each other, comprising:

a base [(122)];

first support means and second support means which are mounted on said base [(122)];

a support core [(32)] spaced from said base [(122)] by said first support means and said second support means, for insertion into said hollow cylindrical body [(W2)] and for supporting said hollow cylindrical body [(W2)]; and

a first gripping member [(238)] and a second gripping member [(268)] disposed on said support core [(32)] for gripping respective protrusions [(8, 9)], which are formed when the fingers ~~(7a through 7d)~~ are held in abutment against opposite ends of abutting regions of said hollow cylindrical body [(W2)], and which extend along a joining direction;

wherein said support core [(32)] has passages [(258, 260)] defined therein for passage of a cooling medium therethrough.

17. (Currently amended) A friction stir welding apparatus [(120)] according to claim 16, wherein said support core [(32)] comprises a first core member [(252)] having a curved portion for abutting against an inner circumferential wall surface of said hollow cylindrical body [(W2)] and a second core member [(254)] having a groove [(256)] with said first core member [(252)] inserted therein.

18. (Currently amended) A friction stir welding apparatus [(120)] according to claim 17, wherein said passages ~~(258, 260)~~ are defined in said second core member [(254)].

19. (Currently amended) A friction stir welding apparatus [(120)] according to claim 17, wherein said support core [(32)] is spaced from said first support means and said second support means by being mounted on a support member [(130)].

20. (Currently amended) A friction stir welding apparatus [(120)] according to claim 17, further including cooling means [(320)] for cooling a rotating friction stir welding tool [(100)].

21. (Currently amended) A friction stir welding apparatus [(120)] for bringing end faces [(1, 2)] of a plate material [(W1)] having fingers ~~(7a through 7d)~~ at corners thereof, into abutment against each other to form a hollow cylindrical body [(W2)], and friction-stir-welding said end faces [(1, 2)] to each other, comprising:

a base [(122)];

first support means and second support means which are mounted on said base [(122)];

a support member [(130)] supported by said first support means and said second support means;

pressing means supported by said support member [(130)] and movable forward or backward by a displacing means [(170)], for pressing said hollow cylindrical body [(W2)] from the side of an inner circumferential wall surface thereof;

a support core [(32)] supported by said support member [(130)], for insertion into said hollow cylindrical body [(W2)] and for supporting said hollow cylindrical body [(W2)]; and

a first gripping member [(238)] and a second gripping member [(268)] disposed on said support core [(32)], for gripping respective protrusions [(8, 9)], which are formed when the fingers ~~(7a through 7d)~~ are held in abutment against opposite ends of abutting regions of said hollow cylindrical body [(W2)], and which extend along a joining direction.

22. (Currently amended) A friction stir welding apparatus [(120)] according to claim 21, wherein said pressing means comprises:

a cam [(174)] movable forward or backward as said displacing means [(170)] moves forward or backward;

a plurality of rods [(172)] engaging said cam [(174)] and extending perpendicularly to the direction in which said cam [(174)] is movable forward or backward; and

pressers [(186)] mounted on respective distal ends of said rods [(172)], for pressing an

inner circumferential wall surface of said hollow cylindrical body [(W2)].

23. (Currently amended) A friction stir welding apparatus [(120)] according to claim 21, wherein said support core [(32)] has a discharge port [(274)] defined therein for discharging a compressed gas.

24. (Currently amended) A friction stir welding apparatus [(120)] for bringing end faces [(1, 2)] of a plate material [(W1)], having fingers ~~(7a through 7d)~~ at corners thereof, into abutment against each other to form a hollow cylindrical body [(W2)], and friction-stir-welding said end faces [(1, 2)] to each other, comprising:

a base [(122)];

first support means and second support means which are mounted on said base [(122)];

a support core [(32)] spaced from said base [(122)] by said first support means and said second support means, for insertion into said hollow cylindrical body [(W2)] and for supporting said hollow cylindrical body [(W2)]; and

a first gripping member [(238)] and a second gripping member [(268)] disposed on said support core [(32)] for gripping respective protrusions [(8, 9)], which are formed when the fingers ~~(7a through 7d)~~ are held in abutment against opposite ends of abutting regions of said hollow cylindrical body [(W2)], and which extend along a joining direction;

wherein either one of said first support means and said second support means is movable toward or away from said support core [(32)] by a displacing means [(148)].

25. (Currently amended) A friction stir welding apparatus [(120)] according to claim 24, ~~having further comprising~~ a guide member [(142)] for guiding said first support means or said second support means while said first support means or said second support means is displaced.

26. (Currently amended) A friction stir welding apparatus $[(120)]$ according to claim 24, wherein said first support means or said second support means comprises natural lock cylinders ~~(126, 128)~~, said natural lock cylinders ~~(126, 128)~~ having piston rods ~~(158, 160)~~ that are elevated to support said support core $[(32)]$ after the natural lock cylinders ~~(126, 128)~~ are inactivated.

27. (Currently amended) A friction stir welding apparatus $[(120)]$ for bringing end faces $[(1, 2)]$ of a plate material $[(W1)]$, having fingers ~~(7a through 7d)~~ at corners thereof, into abutment against each other to form a hollow cylindrical body $[(W2)]$, and friction-stir-welding said end faces $[(1, 2)]$ to each other, comprising:

a base $[(122)]$;

first support means and second support means which are mounted on said base $[(122)]$;

a support core $[(32)]$ spaced from said base $[(122)]$ by said first support means and said second support means, for insertion into said hollow cylindrical body $[(W2)]$ and for supporting said hollow cylindrical body $[(W2)]$;

a first gripping member $[(238)]$ and a second gripping member $[(268)]$ disposed on said support core $[(32)]$ for gripping respective protrusions $[(8, 9)]$, which are formed when the fingers ~~(7a through 7d)~~ are held in abutment against opposite ends of abutting regions of said hollow cylindrical body $[(W2)]$, and which extend along a joining direction;

two aligning boards ~~(286, 288)~~ held in abutment against an end face of said hollow cylindrical body $[(W2)]$ and disposed one on each side of abutting regions of said hollow cylindrical body $[(W2)]$; and

aligning means having a cylinder $[(188)]$ for pressing said hollow cylindrical body $[(W2)]$ from the side of an opposite end face thereof, to displace the hollow cylindrical body $[(W2)]$ until said one face of the hollow cylindrical body $[(W2)]$ abuts against said aligning

boards (286, 288).

28. (Currently amended) A friction stir welding apparatus [(120)] according to claim 27, wherein either one of said first gripping member [(238)] and said second gripping member [(268)] is displaced by said cylinder [(188)].

29. (Currently amended) A friction stir welding apparatus [(120)] according to claim 27, wherein said first gripping member [(238)] or said second gripping member [(268)] is displaced and fits over said protrusion [(8, 9)] of said hollow cylindrical body [(W2)] after displacement of the hollow cylindrical body [(W2)] has finished.

30. A friction stir welding apparatus [(120)] for bringing end faces [(1, 2)] of a plate material [(W1)], having fingers ~~(7a through 7d)~~ at corners thereof, into abutment against each other to form a hollow cylindrical body [(W2)], and friction-stir-welding said end faces [(1, 2)] to each other, comprising:

a base [(122)];

first support means and second support means which are mounted on said base [(122)];

a support member [(130)] supported by said first support means and said second support means;

a support core [(32)] disposed on said support member [(130)], for insertion into said hollow cylindrical body [(W2)] and for supporting said hollow cylindrical body [(W2)];

a first gripping member [(238)] and a second gripping member [(268)] disposed on said support core [(32)], for gripping respective protrusions [(8, 9)], which are formed when the fingers ~~(7a through 7d)~~ are held in abutment against opposite ends of abutting regions of said hollow cylindrical body [(W2)], and which extend along a joining direction;

first pressing means [(352)] supported by said support member [(130)], for pressing an

inner circumferential wall surface of said hollow cylindrical body [(W2)] vertically downwardly with a resilient biasing means; and

- second pressing means supported by said support member [(130)] and displaceable by displacing means [(170)] for pressing an inner circumferential wall surface of said hollow cylindrical body [(W2)] horizontally.

31. (Currently amended) A friction stir welding apparatus [(120)] according to claim 30, ~~having further comprising~~ presser stop means ~~(290a, 290b)~~ for pressing said hollow cylindrical body [(W2)] from the side of an outer circumferential wall surface thereof to a stop.